# Differences in the Amount of Time Spent on Food Shopping, Preparation and Consumption by Obesity Status in US Adults

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**Abstract**

Increase in obesity across the US has drawn focus to the food selection, purchasing and preparation patterns that could influence energy balance. Dining outside of the home and an increase in convenience foods has been attributed to nutritional changes in US food patterns. Therefore, the purpose of this study was to examine differences in the amount of time adults spent on food shopping and preparation to identify differences by age and obesity status. Data from 21,946 adults from the 2006-2008 American Time Use Survey were selected for the analyses. Adults were stratified into two age groups, 20-35 years and 36-55 years. Body mass index data (kg/m2) were recoded into normal weight (NW, 18.5-24.9), overweight (OW, 25-29.9) and obesity (OB, >=30); with the focus on obesity. Underweight adults were excluded from the analyses. Activity record codes attributable to time spent food shopping, on preparation and clean-up as well as eating were summed across individuals. OW adults spent significantly less time shopping for food than NW and OB (P=<0.005), while NW spent significantly more time eating than OW and OB adults (P=<0.008). Food preparation represented less than one-third of the time spent on food, with the greatest amount of time spent by older NW adults. These data suggest significant differences in the time investment into dietary habits by age and weight status in US adults; further research is needed to examine time spent on specific dietary habits, which may contribute to obesity risk.

**Introduction**

It is well established that overweight and obesity rates have developed into a health epidemic in the United States. Currently, more than one-third of US adults are considered obese by CDC standards. According to population data collected from NHANES in 2009-2010, 35.7% of adults age 20 years and over were classified as obese. In 2010, no state had an obesity rate of less than 20%, despite the Healthy People 2010 goal of lowering state obesity rates to 15%. When examining weight trends throughout the past 20 years, it is evident that there has been a dramatic increase in the overweight and obesity rates in United States. Obesity trend data shows that in 1990, the majority of states had obesity rates between 10-14%, with the rest averaging <10% (1). It is important for researchers to acknowledge this dramatic change in order to address potential causes for the increases in overweight and obesity rates.

Extensive research has repeatedly supported the numerous health disparities associated with being overweight or obese. The CDC cites increasing incidence of heart disease, type 2 diabetes, cancer, hypertension, dislipidemia, stroke, liver and gallbladder diseases, respiratory diseases, and gynecological issues, as a person reaches levels of "overweight" or "obese" (2). Climbing overweight and obesity rates are placing Americans at an increased risk for the aforementioned health problems. In addition to the personal toll that these diseases may place on individuals and families, the healthcare system is facing a significant burden as well. In 2008, the national estimated cost of obesity totaled $147 billion. This staggering sum puts the cost of obesity into

perspective, and provides enlightenment to yet another negative consequence of the obesity epidemic (3).

Due to the multi-factorial nature of overweight and obesity, research in this area of concern is broad and expands into multitudes of different areas of study. Contributing factors have been identified within behavioral, environmental, and genetic domains. Such factors include but are not limited to physical inactivity, lack of access to healthy food, emotional issues, age, lack of sleep, and excessive energy consumption (2). Another important contributing factor to this complex issue is the amount of time people invest in activities related to food procurement, preparation, and ingestion.

By using the American Time Use Survey data to continue obesity research, further developments can be made to explore the food behaviors of Americans. Identifying positive and negative behavioral indices will hopefully advance society in the fight against obesity. This research will be an important addition to the literature in nutrition and dietetics, and will help scientists determine feasible and successful interventions to improve eating habits and subsequently the health of our nation.

**Related Research:**

In the literature, several researchers have explored questions related to certain aspects of food behavior, food environment, and the associated uses of time. Zick et al examined trends in American's food related time-use from 1975-2006 using four national time diary surveys. They found that time women spent preparing food declined substantially throughout the time period. For both sexes, grocery-shopping time increased and primary eating time (time spent solely eating) decreased. Additionally,

secondary eating time (eating while something else is the main focus) increased for both men and women. Overall, total eating time (primary and secondary combined) increased for both men and women throughout the time period (4). Such findings may provide insight at a relationship between the shift in American's food related time use and the subsequent rise in obesity rates during this time period. Throughout the time span being studied, simple observable shifts in culture occurred, such as more women entering the work force, notable increases in technology, and an increasing value on busier lifestyles. These cultural shifts seem to align with the food-related time use trends of increases in secondary eating and decreases in food preparation time.

Another study by Zick et al in 2011 builds on the previous research and uses the American Time Use Survey (ATUS) from 2006-2007 to examine time-use choices and healthy body weight. The results show an inverse relationship between time spent eating and BMI for both men and women. Time spent drinking beverages while doing other things (secondary consumption) is linked to a higher BMI for both sexes. For women, time spent in food preparation and clean up is inversely related to BMI. Some analysis on physical activity time-use was completed as well. The researchers concluded that American's time use does have implications for BMI. Specifically, that eating time and context matter, as does food preparation time and time spent in sedentary activities (5).

With a decrease in time spent on food preparation being evident, it is clear that restaurant foods, fast foods, and convenient foods have become more prevalent in the United States. The number of fast food restaurants in the U.S. increased 12.8% between

1992 and 2002; and, as previously mentioned, obesity rates were on the rise during this time period (6). Initially, it is important to understand the offerings that are provided by restaurants and thus, why eating out may be putting people at risk for overweight and obesity. According to an investigation done by the market research firm NPD group, restaurant meals typically have 60% or more calories than the average home-cooked meal. Researchers from University of Pennsylvania and Clemson University surveyed 300 chefs in order to learn more about why calorie counts of restaurant foods were so high. They found that 60% of chefs served 12oz steaks, when the national dietary guidelines recommend an individual portion to be 3oz. They also found that the chefs served big portions because they believed it had better presentation as well as met customer expectations. Only 16% of chefs said calorie content had a strong influence on their portions. Furthermore, 58% of the chefs said that if the diner is served huge portions, it is their responsibility to eat the correct amount (7). However, this responsibility may prove to be too great according to extensive research by Wansink.

Wansink's (8) research has revealed insight into the eating behaviors of humans, and in particular, why people consume large volumes of food. These studies can be applied to restaurant eating behaviors. For example, one study found that people eat more if they are served big portions, because the portion size suggests a consumption norm, telling people what is the appropriate amount to eat. Wansink also suggests that people rely increasingly on external cues to tell them when to stop eating. For instance, many people will stop eating when the bowl is empty or when the TV show is over as opposed to when our stomach is no longer hungry. If people rely on these

types of external cues when eating restaurant or convenience foods and eat to clear their plate, they could be consuming significantly more calories. Another supporting study by Wansink suggests that people consistently underestimate calories in items as they get larger, and this is true about very large, calorie-laden meals. Clearly, evidence from both chef surveys and nutrition research demonstrate that restaurants may put people at higher risk for eating more calories, which may lead to weight gain and in turn obesity (8).

Other researchers have explored the question of energy intake trends over time in America. One study examined trends in energy intake in America between 1977 and 1996 by using the Nationwide Food Consumption Survey. More specifically, they studied trends in location and food sources of energy intake. The study found that total energy increased over the 20 year time period, with shifts from at-home eating to away from home eating. The study also found large increases in salty snacks, pizza, and soft drinks. These shifts were similar across all age groups studied, and this demonstrates the incidence of broad shifts in food environment across the population. This study further supports the shift in Americans' eating behaviors, especially to away-from home eating, which as previously mentioned, can have increased calorie consequences (9).

The CDC has recognized fruits and vegetables as a key factor in weight management (10). With this knowledge in mind, Crawford et al examined what food consumption, shopping, and preparation behaviors led to an increase in fruit and vegetable consumption in women. The study found that women who enjoyed meal planning and who spent more time on food shopping and food preparation had greater

intake of fruits and vegetables. Conversely, women who found cooking a chore and spent less time on food preparation and meal planning had lower intakes of fruits and vegetables. These women were also more likely to eat fast food and away-from home meals and to eat while in front of the television. This study highlights the importance of food behaviors and time use and how they relate to fruit and vegetable intake, and likewise, weight management (11).

Additional research looked at secular trends in dietary intake in the United States by using NHANES data. Survey data was used from 1971-2000, and the researchers examined trends in energy intake among other nutritional indicators. During the 30 year time period, the study found energy intake increased in adults, with contributing factors being identified as increases in away from home eating, larger portion sizes, increases in sugar sweetened beverages, and changes in snacking habits. Similar to previous research discussed, this study demonstrates the importance of monitoring dietary behavior trends, which may lead to increased obesity risk (12).

Examination of the past research as a whole indicates that most studies have found a link between certain dietary behaviors and time-use habits and an increased risk for overweight and obesity. However, it is important to continue research in this area in order to solidify the link and provide fundamental data to encourage beneficial food and time use behaviors in the population. By looking at the American Time Use Survey (ATUS), we are able to pull data from this relatively new resource examining how American's use their time. ATUS provides a wide amount of data pertaining to how, where, and with whom American use their time. The data set is valuable for economic,

health, safety, work, and family life research. ATUS has been available since 2005, and studies of the data have appeared in a variety of publications including American Economic Review, Science, Journal of Physical Activity and Health, Journal of Human Resources, and others (19). By exploring this information set, we will be able to determine if there is a link between time spent on food behaviors related to food shopping, preparation, consumption and BMI. As previously stated, BMI carries significant determination on a matter of health disparities, and examining data that can help people lower their BMI is a worthwhile endeavor.

**Methods**

*Purpose and Objectives*: The purpose of this study was to examine differences in the amount of time adults spent on food shopping**,** preparation, and consumption to identify differences by age and obesity status. Increases in obesity rates have prompted a need for information regarding American's dietary behaviors. Not only are food choices important, but time spent in certain dietary behaviors may be important as well. This study aims to draw focus to American's time usage regarding dietary behaviors and the relation to BMI, and consequently, identify areas for further research.

*Data Source:* Data from the 2006-2008 American Time Use Survey (ATUS) was used for this study. ATUS is sponsored by the Bureau of Labor Statistics and is conducted by the U.S Census Bureau. ATUS is a nationally representative estimate of how, where, and with whom Americans spend their time. Households that have completed the Current Population Survey are eligible to be selected for ATUS. From the eligibility pool, a variety of demographics are selected, and one person over the age of 15 is selected

from the household to respond to a survey about how they use their time. The data is collected through telephone interviews, and households that did not provide a telephone number are given a toll-free number to call. Then, trained coders use software that assigns codes to all of respondent's activities. The classification contains 18 major time use categories, and each of those is broken down into more detailed levels. ATUS has collected over 112,000 interviews since 2003, and this information is being used in a wide variety of fields including healthcare, economics, family and domestic studies, work-life studies, and for media purposes as well (19).

*Sample Data:* Data from 21,946 adults from the 2006-2008 American Time Use Survey were selected for the analyses. Adults were stratified into two age groups, 20-35 years and 36-55 years. Body mass index data (kg/m2) were recoded into normal weight (NW, 18.5-24.9), overweight (OW, 25-29.9) and obesity (OB, >=30); with the focus on obesity. Underweight adults were excluded from the analyses. Body weight and height are self-reported in the phone survey. We calculated BMI during data preparation in order to assign individuals to a weight status group.

*Data Preparation:* Coding lexicons are assigned to each activity within ATUS. There are 18 major time-use category lexicons, and within those lexicons, further sub-category lexicons help specify activities. For our study, we grouped certain lexicons together in order to sum activities for cumulative purposes. Our first activity group being examined is Food Preparation, Presentation, and Cleanup. To identify this code for analysis, we combined the appropriate lexicons. Under the category of Household activities (lexicon 02), we used the subcategory Food and Drink Prep, Presentation, and Clean-up (lexicon

02). Within the lexicon 0202, the other subcategories were added including food and drink prep (01), food presentation (02), and kitchen and food cleanup (03). See table 1 below for coding lexicon designations.

| **02 Household Activities** |
|---|
| **01 Housework**<br>01 Interior cleaning<br>02 Laundry<br>03 Sewing, repairing, & maintaining textiles<br>04 Storing interior hh items, inc. food<br>99 Housework, n.e.c.*<br>**02 Food & Drink Prep., Presentation, & Clean-up**<br>01 Food and drink preparation<br>02 Food presentation<br>03 Kitchen and food clean-up<br>99 Food & drink prep, presentation, & clean-up, n.e.c.* |

**Table 1: coding lexicon designations in ATUS used for food & drink prep, presentation, and clean up**

The next activity category for analysis is Food Shopping. We used the category Consumer Purchases (lexicon 07) and the subcategory, Shopping (lexicon 01). Then, within lexicon 0701, we used subcategories Grocery Shopping (lexicon 01) and Purchasing food, not groceries (lexicon 03). See table 2 below for coding lexicon designations.

| **07 Consumer Purchases** |
|---|
| **01 Shopping (Store, Telephone, Internet)**<br>01 Grocery shopping<br>02 Purchasing gas<br>03 Purchasing food (not groceries)<br>04 Shopping, except groceries, food and gas<br>05 Waiting associated with shopping<br>99 Shopping, n.e.c.* |

**Table 2: coding lexicon designations in ATUS used for Food Shopping**

For the final activity category, we analyzed Time Spent Eating and Waiting for Food. We

used the category Eating & Drinking (lexicon 11) and then the subcategories Eating and Drinking (01) and Waiting associated with Eating and Drinking (02). See table 3 for coding lexicon designations.

| **11 Eating and Drinking** |
|---|
| **01 Eating and Drinking**<br>01 Eating and drinking<br>99 Eating and drinking, n.e.c.*<br>02 Waiting associated with eating & drinking<br>01 Waiting associated w/eating & drinking<br>99 Waiting associated with eating & drinking, n.e.c.*<br>99 Eating and Drinking, n.e.c.*<br>99 Eating and drinking, n.e.c.* |

**Table 3: coding lexicon designations in ATUS used for Eating and Drinking**

For each individual used in our study, we summed all of his or her relevant codes for the day and assigned them to a weight status group depending on their BMI. Then, a mean amount of time was developed for each activity for each weight status group. The data was then appropriately stratified and read for analysis.

*Data Analysis:* Our goal was to analyze the differences in mean time spent on each major activity by weight status. In order to identify significant differences within the three means from the three weight groups, we used an ANOVA analysis of variance. After significance was found from the ANOVA test, we used post hoc analysis to identify which means were significant. These tests were run on both age groups.

**Results**

Results are reflected in the table pictured below.

| Age group | Activity | Normal Weight | Overweight | Obese | P |
|---|---|---|---|---|---|
| **20-35 years** | **Food preparation, presentation and cleanup** | **27.2 (1.04)** | **22.8 (1)** | **27.1 (1.76)** | **0.005** |
| | Food preparation, presentation, clean-up | 0.2 (0.11) | 0 (0.03) | 0 (0) | |
| | Food and drink preparation | 21.6 (0.87) | 18.2 (0.85) | 21.3 (1.24) | |
| | Food presentation | 0.2 (0.05) | 0.2 (0.04) | 0.3 (0.09) | |
| | Kitchen and food clean-up | 5.2 (0.33) | 4.4 (0.32) | 5.5 (0.64) | |
| | **Food shopping** | **6.8 (0.42)** | **5.5 (0.36)** | **7.3 (0.79)** | **0.020** |
| | Grocery shopping | 5.5 (0.41) | 4 (0.34) | 6 (0.73) | |
| | Purchasing food (not groceries) | 1.3 (0.1) | 1.5 (0.12) | 1.4 (0.14) | |
| | **Time eating and waiting for food** | **65.9 (1.28)** | **62 (1.32)** | **59.5 (1.76)** | **0.008** |
| | Eating and drinking | 65.7 (1.27) | 61.9 (1.31) | 59.4 (1.76) | |
| | Waiting associated w/eating & drinking | 0.2 (0.07) | 0.1 (0.06) | 0.1 (0.07) | |
| **36-55 years** | **Food preparation, presentation and cleanup** | **39.5 (1.03)** | **31.7 (0.9)** | **31.7 (1.05)** | **<0.001** |
| | Food preparation, presentation, clean-up | 0.6 (0.19) | 0.8 (0.22) | 0.6 (0.21) | |
| | Food and drink preparation | 29.6 (0.84) | 23.8 (0.75) | 24.3 (0.86) | |
| | Food presentation | 0.4 (0.06) | 0.2 (0.04) | 0.2 (0.04) | |
| | Kitchen and food clean-up | 8.8 (0.31) | 6.8 (0.3) | 6.6 (0.33) | |
| | **Food shopping** | **8.3 (0.37)** | **6.5 (0.28)** | **7.6 (0.43)** | **<0.001** |
| | Grocery shopping | 7.2 (0.37) | 5.3 (0.28) | 6.2 (0.43) | |
| | Purchasing food (not groceries) | 1.1 (0.06) | 1.2 (0.07) | 1.4 (0.09) | |
| | **Time eating and waiting for food** | **67.3 (0.91)** | **64.7 (0.83)** | **62.7 (0.86)** | **0.001** |
| | Eating and drinking | 67.1 (0.9) | 64.5 (0.82) | 62.5 (0.85) | |
| | Waiting associated w/eating & drinking | 0.2 (0.05) | 0.1 (0.03) | 0.1 (0.04) | |

Table 1:

Mean time spent for each activity is summed using the lesser activities as described in data preparation. P values were then calculated for the three main activities (in bold) for each weight status in the age groups. For the 20-35 age group, OW (overweight) adults were found to spend significantly less time on meal preparation than NW (normal

weight) and OB (obese). OW adults were also found to spend significantly less time shopping for food than NW and OB. NW spend significantly more time eating than OW and OB for this age group. For the 36-55 age group, NW were found to spend significantly more time preparing food than OW and OB. OW were found to spend significantly less time food shopping than NW and OB. NW were found to spend significantly more time eating than OW and OB. These findings may be indicative of the influence of certain time-use habits and the effect that they have on weight status.

**Discussion**

The results from data analysis were mixed compared to our hypotheses. With three separate activities being analyzed and 2 age groups, the results prompt additional questions, which may be the subject of further time-use and obesity research. First, the results regarding food preparation are differing between age groups. The 20-35 age group found that OW individuals spend significantly less time preparing meals than NW and OB, while the 36-55 age group found NW spent significantly more time on meal prep than the other 2 groups. The literature that exists on food preparation aligns with the results found for the older age group. As previously discussed, other research has suggested that more time on home-meal preparation may be linked to lower rates of OW/OB. The results from the younger age group prompt questions regarding if younger age groups spend less time as a whole preparing meals, and if the time-use habits of younger age groups differ significantly from older age groups. Further research in the dietary habits of young-adults as opposed to older adults may provide some insight into the continued shift of dietary habits in the United States.

For the activity category of Food Shopping, OW people were found to spend significantly less time food shopping than NW and OB for both age groups. These results demonstrate the importance of continued time-use research related to weight status, as they are still generally unclear. Many hypotheses could be drawn as to why the OW spent less time than NW and OB, however actual correlations are still unclear at this time and these results cannot be aligned to the previous literature.

For the activity category of Time Eating and Waiting for Food, NW spent significantly more time eating than OW and OB for both age groups. These results may be related to certain habits previously identified in the literature. For one, OW and OB people have been shown in some research to be more likely to skip breakfast (13). Skipping breakfast would therefore cause them to register as spending less time eating on ATUS, as opposed to NW people who may eat breakfast. Some research has suggested that regular meal patterns and increased breakfast frequency are inversely associated with obesity and chronic disease. Extensive research in the area of breakfast and regular meal consumption is still somewhat limited, but this would be a beneficial area for future research (14). Another study analyzed breakfast patterns of subjects maintaining weight loss in the National Weight Control Registry. They found that eating breakfast was a common characteristic of individuals who were able to maintain weight loss (15). Another study done on middle-aged men found that eating breakfast may contribute to prevention of weight gain as opposed to skipping breakfast (16). We hypothesize that our findings of NW people spending more time eating may align with the literature regarding regular breakfast consumption. More research should continue

to be done regarding time spent eating, as this appears to be a promising finding.

Another hypothesis as to why NW people spent significantly more time eating than OW and OB is that NW people eat more slowly. Previous research suggests that eating more slowly may be a habit related to lower weight status. In one study, the researchers found that energy intake was lower and satiety was higher in women who ate food at a slower rate (17). In another study, researchers examined weight change patterns of male subjects over an 8-year time period. They found that the group labeled as "fast-eaters" gained a statistically significant amount of weight compared to the slow and medium eating speed groups, even after adjusting for age, exercise, smoking, and drinking (18).

When speaking of research regarding eating speed, it may also be helpful to mention the relatively new field of mindful eating and how our research may be relevant to this field. Mindful eating focuses on strategies and behaviors that eliminate distractions and focus on the body's internal cues. Limited research exists addressing eating while distracted and if this increases eating speed, and likewise, food intake. Our results suggest that there are some behavioral components regarding eating time, which may be significant for the health of individuals. It would be worthwhile to continue to explore food related time-use and behaviors, as the research is mounting that these factors have a large impact on weight status, and likewise, the health of Americans.

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